



# **RADIO FREQUENCY ENGINEERING REPORT**

## **Proposed Bethel, CT Wireless Facility - CT1155C BETHEL & CT1155C SITE1 - Bethel, CT**



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## Overview

This document is provided in support of AT&T's proposal to operate a ground mounted, wireless telecommunication facility in Bethel, CT.

This document addresses AT&T's need for the proposed facility and validates that there are no other existing structures that meet AT&T's coverage objective for this area. The proposed facility to be located at one of the 2 candidate sites (CT1155C SITE1) or (CT1155C BETHEL) at 62+64 Codfish Hill Road in the city of Bethel at a proposed antenna centerline height of 146 feet for site (CT1155C SITE1) or 166 feet for site (CT1155C BETHEL) above ground level will best address the coverage objective and provide the needed interconnectivity to AT&T's existing neighboring sites and surrounding communities.

## Introduction

As enabled under its Federal Communications Commission ("FCC") Licenses, AT&T seeks to design its wireless network to provide reliable and adequate wireless services to its customers, whether those customers are on the street, in a vehicle, or in a building. Providing reliable and adequate service to its customers in each context is critical for AT&T to provide the quality of wireless service that customers demand, and to meet objectives of Congress that a robust, competitive and low cost wireless communications capacity be developed to serve the entire nation.

In order to build out its network and meet customer demand for voice and data services, AT&T must have in place a system of low power "cell sites" to serve portable wireless communication handsets and mobile telephones. A typical cell site, such as the one proposed, consists of antenna mounted to a building, tower, church or other structure. The antennas are connected to radio operating equipment housed at or near the structure.

To maintain effective, reliable and uninterrupted service, there must be a continuous series of cell sites located within close proximity to each other so as to overlap in a system comparable to a honeycomb pattern. If there is no cell site available to accept/receive the signal, network service to the mobile telephone/data service will terminate involuntarily. Accordingly, the overlap of coverage is necessary for the signal to transfer from one cell to another cell site seamlessly and without involuntary termination.

A number of factors determine the distance between the cell sites, including, but not limited to, topography, physical obstructions, foliage, antenna height, operating frequency and line-of-site.

## Coverage Objective

AT&T currently has several of existing facilities in Bethel that serve some parts of the city, with additional coverage provided by AT&T cell sites from neighboring town of Newtown.

Map 1, titled, "AT&T Current Coverage at Bethel, CT with CT1155C BETHEL and CT1155C SITE1 Turned-off", is a propagation plot that depicts current coverage at Bethel and the neighboring towns. In Map 1, Eastern part of Bethel has marginal or very poor coverage and areas where there is no coverage at all. It also shows that there is inadequate coverage overlap between existing sites CT5511, CT2268 and CT5515.

In the map, "green" ( $\Rightarrow$ -74 dBm) represents "in-building" coverage which allows for signal penetration losses (solid walls, partitions, etc.) of 10 dB. Color "yellow" represents "in-vehicle" ( $\Rightarrow$ -82 dBm) which takes into account 5 to 8 dB of vehicle penetration attenuation.

AT&T determined that significant coverage gaps exist particularly in the following roads:

- Codfish Hill Road, Bethel, CT
- Dodgington Road, Newtown, CT
- Putnam Park Road, Bethel, CT
- Sugar Street, Newtown, CT
- Wolfpits Road, Bethel, CT
- Taunton Hill Road, Newtown, CT
- Buckboard Ridge, Bethel, CT
- Legend Drive, Bethel, CT
- Plumtrees Road, Bethel, CT
- Chestnut Ridge Road, Bethel, CT

Improving the coverage on above mentioned roads would not only benefit commuters but also provides better signal penetration on houses and other establishments within the area as well. Map 2, titled, "AT&T Proposed Coverage at Bethel, CT with CT1155C SITE1 Turned-on @ 146' AGL", shows the AT&T coverage at Bethel with the proposed facility (CT1155C SITE1) turned on. Map 3, titled, "AT&T Proposed Coverage at Bethel, CT with CT1155C BETHEL Turned-on @ 166' AGL", shows the AT&T coverage at Bethel with the proposed facility (CT1155C BETHEL) turned on. Comparing Map 1 and Map 2 and Map 1 and Map 3, clearly shows the coverage improvement provided by any of these two candidate sites. The roads mentioned above will have coverage after adding the proposed site. This would mean better quality and uninterrupted service for subscribers travelling between these roads as well as better signal penetration for houses, business establishments, etc. The following tables will show the area and population in this area that will have service from the proposed facility.

Table 1 below shows the area analysis for current and proposed coverage. AT&T currently covers 6.236 square miles of Bethel. The proposed site (CT1155C SITE1) will cover an additional 2.598 square miles, a gain of 41.66% relative to current coverage which also equates to 15.40% of the total area of Bethel, CT, whereas the proposed site (CT1155C BETHEL) will cover an additional 3.844 square miles, a gain of 61.64% relative to current coverage which also equates to 22.79% of the total area of Bethel, CT.

Area Coverage (sq mi)						
Candidate Site	Bethel Total Area	Area covered by existing sites (=> -82 dBm)	Area not covered (< -82 dBm)	Area that will be covered with the proposed site (=> -82 dBm)	Remaining Area not covered (< -82 dBm)	Proposed Area Gain
CT1155C SITE1	16.87	6.236	10.634	8.834	8.036	2.598
CT1155C BETHEL	16.87	6.236	10.634	10.08	6.79	3.844

Table 2 below shows the population analysis (2008 Census Block Data) for current and proposed coverage. AT&T currently covers 7,150 of Bethel population. The proposed site (CT1155C SITE1) will cover an additional 2,980, a gain of 41.68% relative to population currently covered which also equates to 15.40% of Bethel total population, whereas the proposed site (CT1155C BETHEL) will cover an additional 3,989, a gain of 55.79% relative to population currently covered which also equates to 20.62% of Bethel total population.

Population Coverage (2008 Census Block Data)						
Candidate Site	Bethel Total Population	Population covered by existing sites (=> -82 dBm)	Population not covered (< -82 dBm)	Population that will be covered with the proposed site (=> -82 dBm)	Remaining Population not covered (< -82 dBm)	Proposed Population Gain
CT1155C SITE1	19,350	7,150	12,200	10,130	9,220	2,980
CT1155C BETHEL	19,350	7,150	12,200	11,139	8,211	3,989

Table 3 below shows the roads that will be covered by proposed site with average daily traffic data available from CT DOT website.

Street Name	Average Daily Traffic (2012)
Codfish Hill Rd., Bethel, CT	7,800
Dodgington Rd., Newtown, CT	6,700
Putnam Park Rd., Bethel, CT	4,200
Sugar St., Newtown, CT	4,000
Wolfpits Rd., Bethel, CT	2,200
Taunton Hill Rd., Newtown, CT	1,100

Table 4 below includes AT&T's existing surrounding sites.

Site ID	Longitude	Latitude	Address	Town	State	Structure Type	Antenna
							Centerline (ft)
CTU5182	-73.273599	41.378292	201 SOUTH MAIN STREET	NEWTOWN	CT	MONOPOLE	110
CTU5511	-73.337899	41.389792	8 FERRIS ROAD	NEWTOWN	CT	MONOPOLE	88
CTV2125	-73.374055	41.42552	6 FAIRFIELD DRIVE	NEWTOWN	CT	MONOPOLE	152
CTV2157	-73.424443	41.403409	48 NEWTOWN ROAD	DANBURY	CT	MONOPOLE	100
CTV2268	-73.39658	41.362206	23 SPRING HILL LANE	BETHEL	CT	MONOPOLE	122
CTV5176	-73.401699	41.415792	7 STONY HILL ROAD	BETHEL	CT	UTILITY	145
CTV5178	-73.343899	41.427792	20 BARNABAS ROAD	NEWTOWN	CT	SELF SUPPORT	135
CTV5513	-73.424999	41.360092	11 FRANCIS J CLARKE CIRCLE	BETHEL	CT	MONOPOLE	127
CTV5515	-73.39198	41.339903	4 DITTMAR ROAD	REDDING	CT	SELF SUPPORT	98

## Summary

The significant coverage gap seen on Map 1, demonstrates the need for an additional site within the area. It clearly shows that current coverage does not provide sufficient coverage overlap between the sites within Bethel. In other words, existing sites and facilities will not cover the gap in AT&T's service in this area of Bethel.

## Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate.



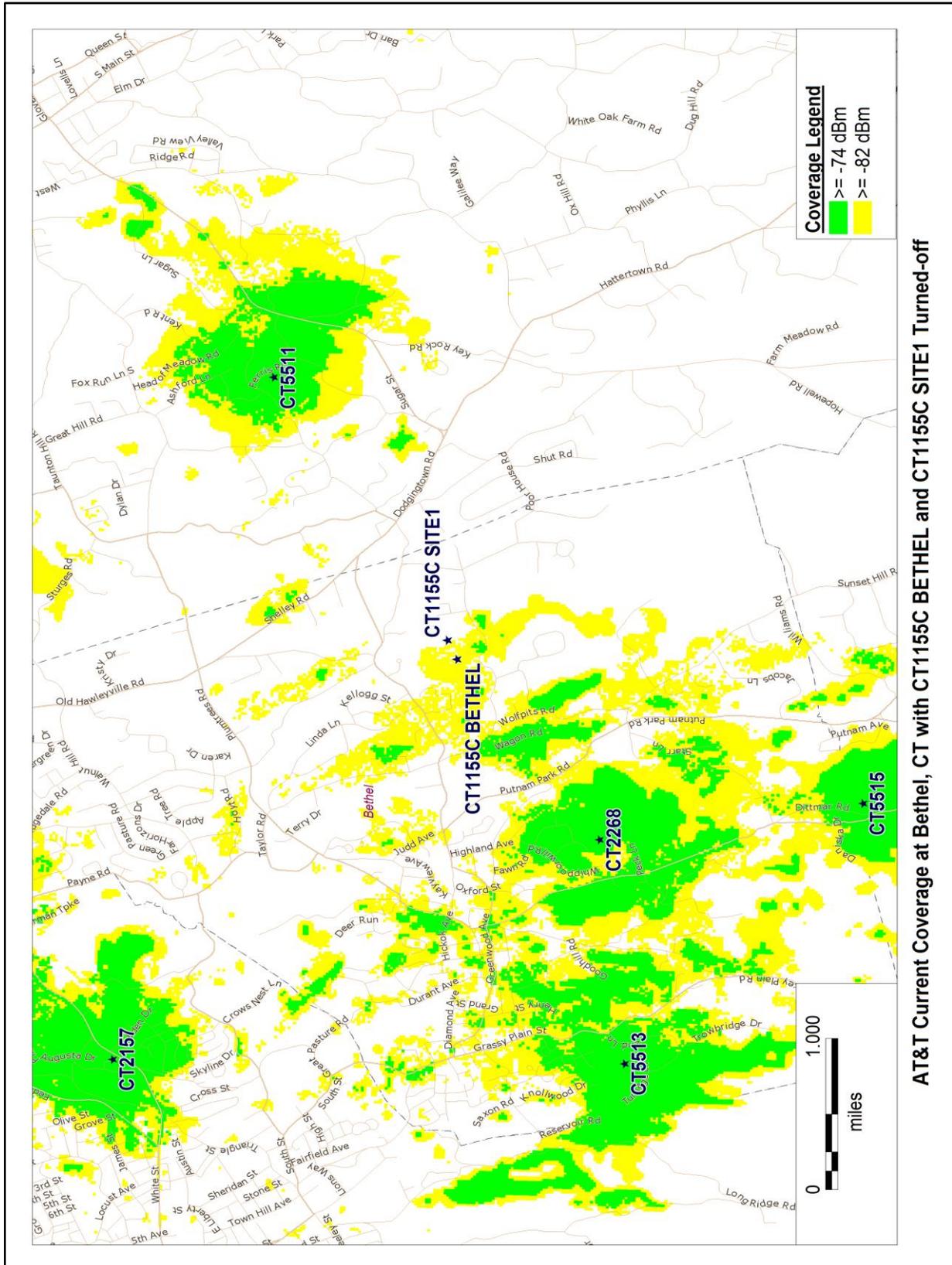
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 Michael Lawton  
 SAI Communications

February 11, 2015

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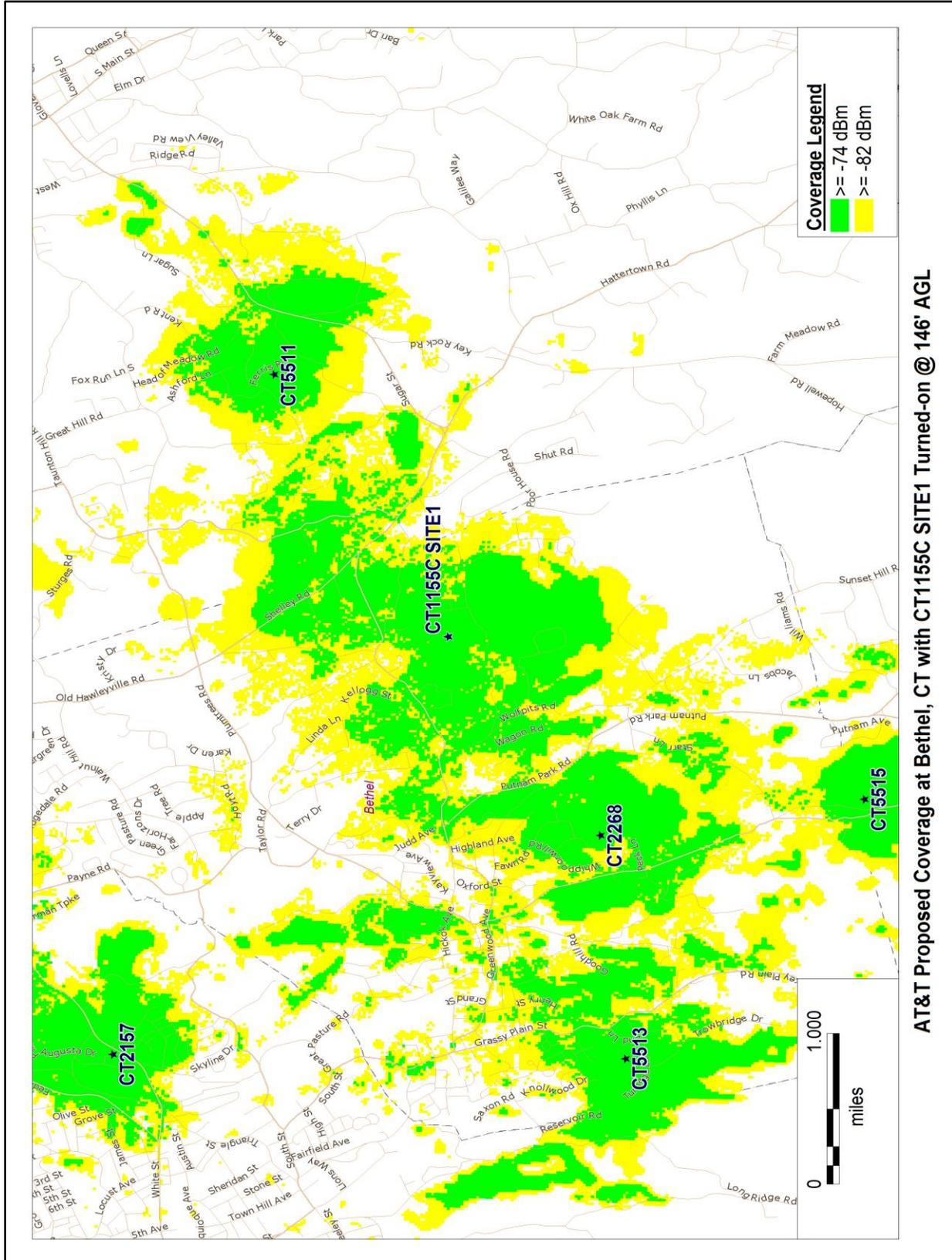
## Attachments

Map:1



AT&T Current Coverage at Bethel, CT with CT1155C BETHEL and CT1155C SITE1 Turned-off

Map:2



AT&T Proposed Coverage at Bethel, CT with CT1155C SITE1 Turned-on @ 146' AGL

Map 3:

